

Shenzhen Uascent Technology Co., Ltd

Universal Ascent Holdings Limited

UAM053

Wi-Fi Single-band 1T1R 802.11b/g/n/ax

Module Datasheet

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Revision History.

Version	Date	Revision Content	Draft	Approved
1.0	2024/11/06	New version	Bella	
1.1	2025/02/20	Modify Flash memory	Bella	

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1 Overview.

1.1 Introduction.

UAM053 is a cost-effective WIFI+BLE module developed by Uascent Technology, supporting Bluetooth dual mode 5.2 and IEEE 802.11 b/g/n/ax protocol standards, lightweight TCP/IP protocol stack, STA, AP, and Direct modes, and Matter protocol. Users can use this module to add networking functions to existing devices or build independent network controllers.

1.2 Features.

- Operate at ISM frequency bands (2.4GHz).
- Standard IEEE 802.11b/g/n/ax.
- Support WiFi+Bluetooth 5.2.
- Support Wi-Fi and BLE coexist.
- Support BLE assists in fast Wi-Fi connection.
- Built-in single core RISC-V MCU with a main frequency of up to 320MHz, can be used as an application processor.
- Built-in 64KB ROM, 512KB SRAM, 4MByte Flash, 32byte eFuse.
- Built-in TR switch, BALUN, LNA, PA, and PCB onboard antenna.
- Support remote firmware OTA upgrade.
- Support STA, AP, STA+AP and Direct working modes.
- Support WPA/WPA2/WPA3 security protocol.

1.3 Recommended Operating Rating.

Description		Min	Typ	Max	Unit
Ambient Temperature (TA)		-20	25	85	deg.C
Vcc		3.0	3.3	3.6	V
(VOL)	Output low voltage	VSS	/	VSS+0.3	V
(VOH)	Output high voltage	VCC-0.3	/	VCC	V

1.4 Reference power consumption for conventional continuous operation.

Parameter	Condition / Notes	Typ.	Unit
TX model			
I _{RF}	11b 11M	280	mA
I _{RF}	11g 54M	250	mA
I _{RF}	11n HT20 MCS7	250	mA
I _{RF}	11n HT40 MCS7	250	mA

I_{RF}	11ax HE20 MCS7	250	mA
I_{RF}	11ax HE40 MCS7	250	mA
RX model			
I_{RF}	11b 11M	80	mA
I_{RF}	11g 54M	80	mA
I_{RF}	11n HT20 MCS7	80	mA
I_{RF}	11n HT40 MCS7	80	mA
I_{RF}	11ax HE20 MCS7	80	mA
I_{RF}	11ax HE40 MCS7	80	mA

1.5 ESD Specifications

Item	Description	Value	Unit
Human Body Mode (HBM)	Electrostatic Discharge Tolerance under Human Body Model	± 4	KV
CDM	Electrostatic Discharge Tolerance under Charged Device Model	± 0.2	KV

2 Module usage precautions.

When using the WIFI module of Uascent Technology, a certain tolerance should be reserved for the output current of the power supply. It is recommended that the output current of the power supply be $\geq 500\text{mA}$, and a suitable power supply IC packaging should be selected. When supplying LDO power, attention should be paid to the issue of heating, and when supplying DC-DC power, attention should be paid to the issue of overshoot at the moment of power on.

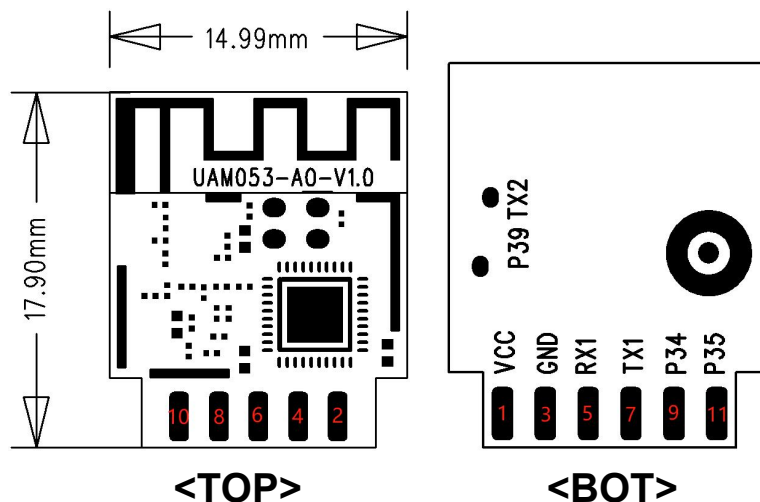
3 WiFi Specification.

Features	Descriptions
Main Chipset	BEKEN : BK7235
Operating Frequency	2.412~2.484GHz
Operating Voltage	3.0~3.6V
WIFI Standard	IEEE 802.11b/g/n/ax
PHY Data rates	Wi-Fi: 802.11b: 11, 5.5, 2, 1 Mbps 802.11g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps HT20 MCS0-MCS7 HT40 MCS0-MCS7 HE20 MCS0-MCS7 HE40 MCS0-MCS7
Transmit Output	Wi-Fi: 802.11b@11Mbps 16 $\pm$ 2dBm 802.11g@54Mbps 15 $\pm$ 2dBm

Power	802.11n@HT20 MCS7 14±2dBm 802.11n@HT40 MCS7 14±2dBm 802.11ax@HE20 MCS7 14±2dBm 802.11ax@HE40 MCS7 14±2dBm
EVM	802.11b /11Mbps: EVM ≤ -10dB 802.11g /54Mbps: EVM ≤ -25dB 802.11n /HT20 MCS7: EVM ≤ -27dB 802.11n /HT40 MCS7: EVM ≤ -27dB 802.11ax /HE20 MCS7: EVM ≤ -27dB 802.11nax/HE40 MCS7: EVM ≤ -27dB
Receiver Sensitivity (HT20)	802.11b@8% PER 11Mbps ≤ -88dBm
	802.11g@10% PER 54Mbps ≤ -74dBm
	802.11n@10% PER MCS 7 ≤ -70dBm
Operating Channel	Wi-Fi 2.4GHz: 11: (Ch. 1-11) – United States(North America) 13: (Ch. 1-13) – Europe 14: (Ch. 1-14) – Japan
Antenna	PCB onboard antenna

4 Pin Descriptions.

4.1 Pin Outline.



4.2 Pin Definition.

Pin No.	Name	Type	Description	Voltage
1	3V3	P	Supply 3.3V	
2	P32	I/O	GPIO32/CIS_PXD0/PWM6/Touch sensor 6	
3	GND	P	Ground	
4	P33	I/O	GPIO33/CIS_PXD1/PWM7/Touch sensor 7	
5	RX1	I/O	UART_RX1/GPIO10	

6	P25	I/O	GPIO25/IRDA/PWM5/ADC1	
7	TX1	I/O	UART_TX1/GPIO11	
8	ADC4	I/O	ADC4/GPIO28/I2S_MCLK/Touch sensor 2	
9	P34	I/O	GPIO34/CIS_PXD2/PWM8/Touch sensor 8	
10	CEN	I/O	Chip enable, active high	
11	P35	I/O	GPIO35/PXD3/PWM9/Touch sensor 9	

※ P:POWER I:INPUT O:OUTPUT

5 Dimensions.

5.1 Module Picture.

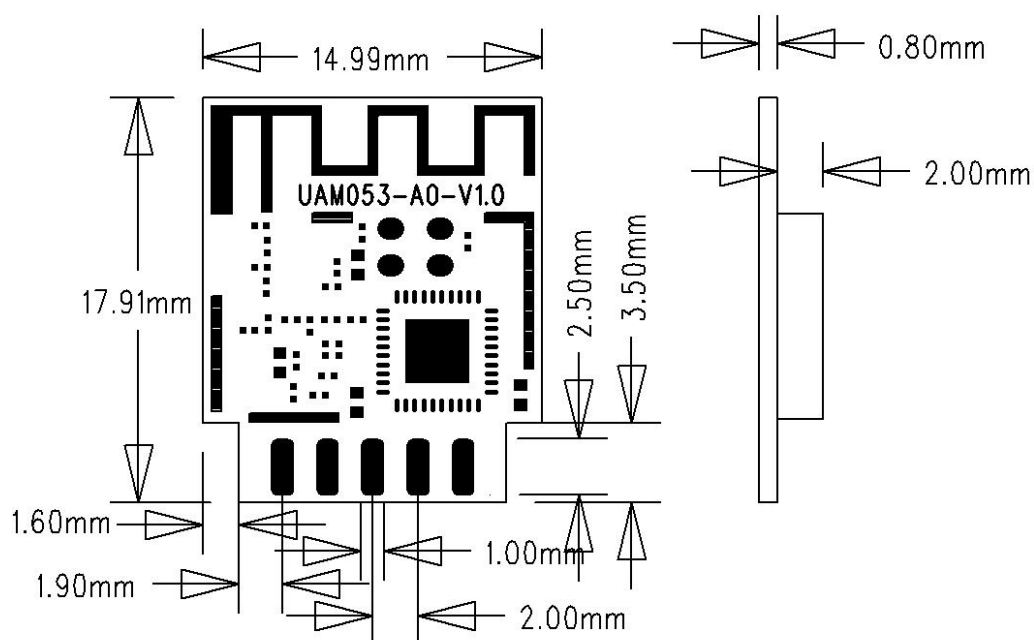


TOP

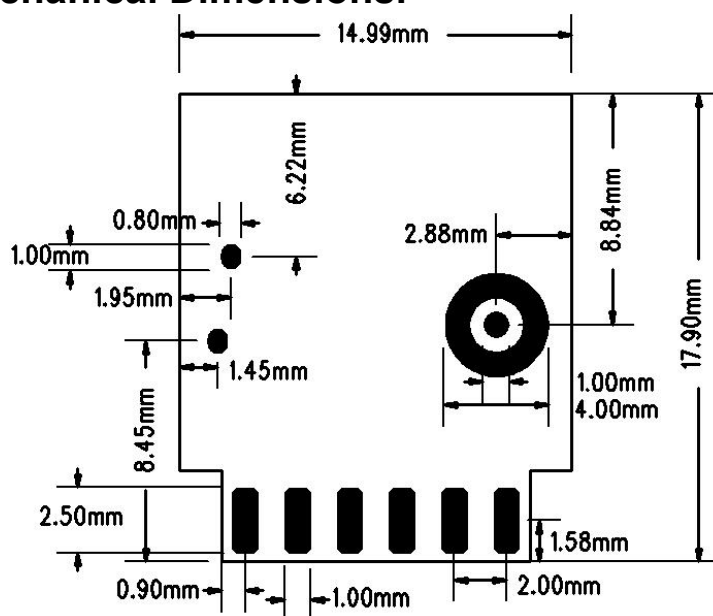


BOTTOM

L:17.91 x W:14.99 x H:2.8 (±0.2) unit=mm

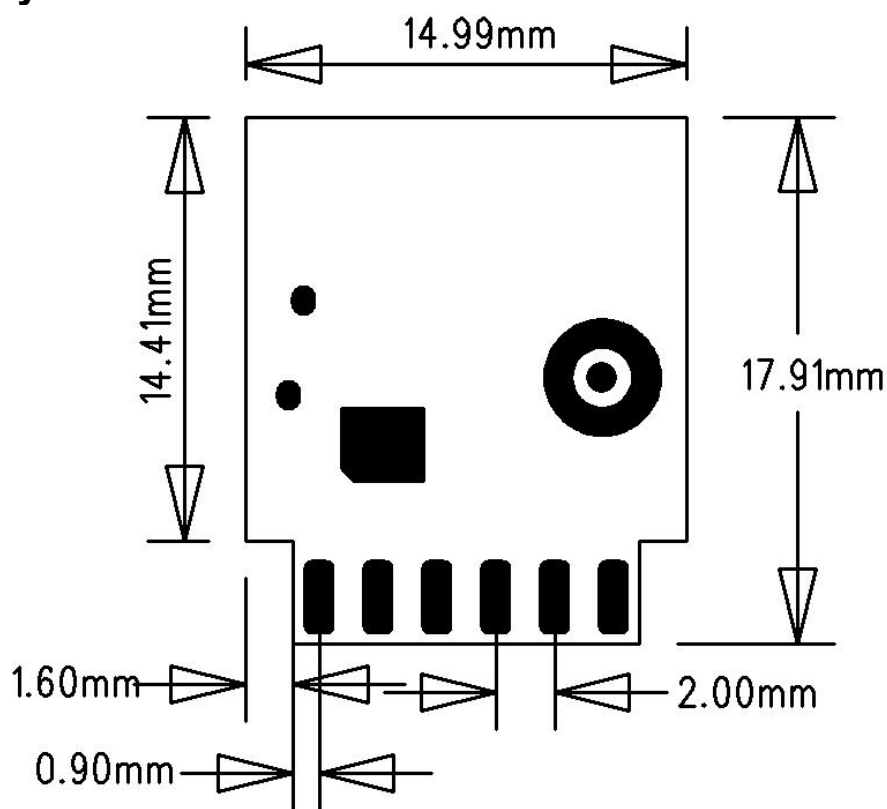


5.2 Module Mechanical Dimensions.



BOTTOM (unit=mm)

5.3 PCB Layout Reference.



(unit=mm)

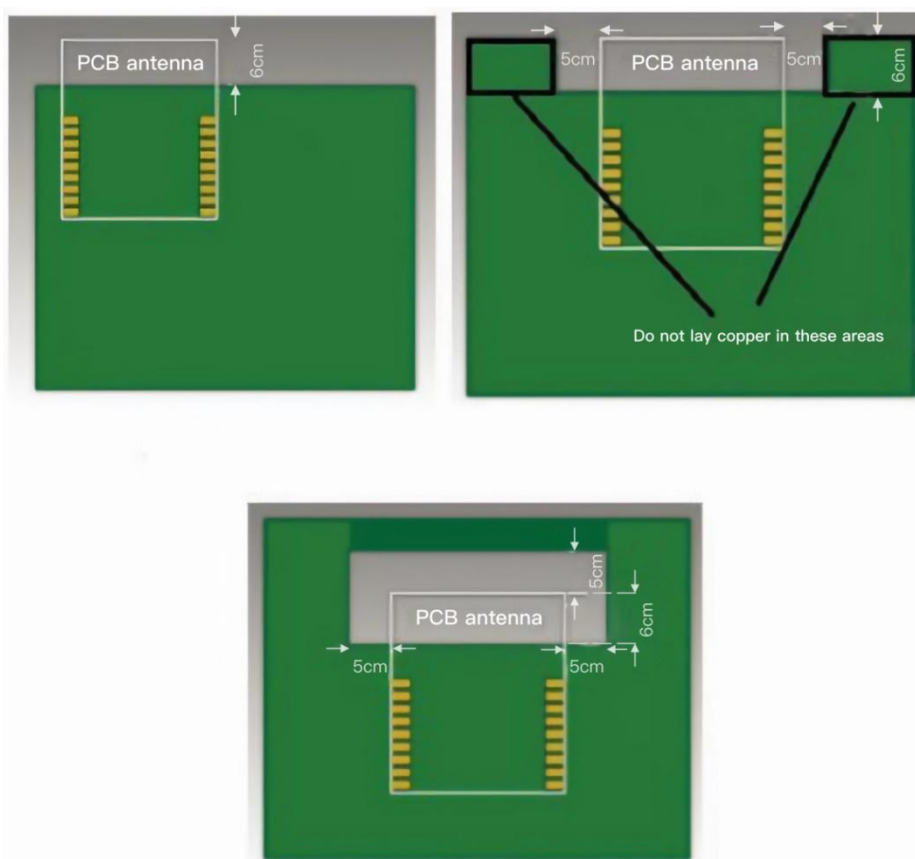
6 Antenna Information.

6.1 Antenna type.

This module antenna type is PCB on-board antenna with antenna gain of -1.2dBi (MAX)

6.2 Module layout considerations.

The UAM053 module shall be welded to the PCB board. In order to obtain the best RF performance. Under the PCB on-board antenna, there should be no copper laying, device and wiring. During PCB design, the corresponding area should be cleared. As shown in the following figure.



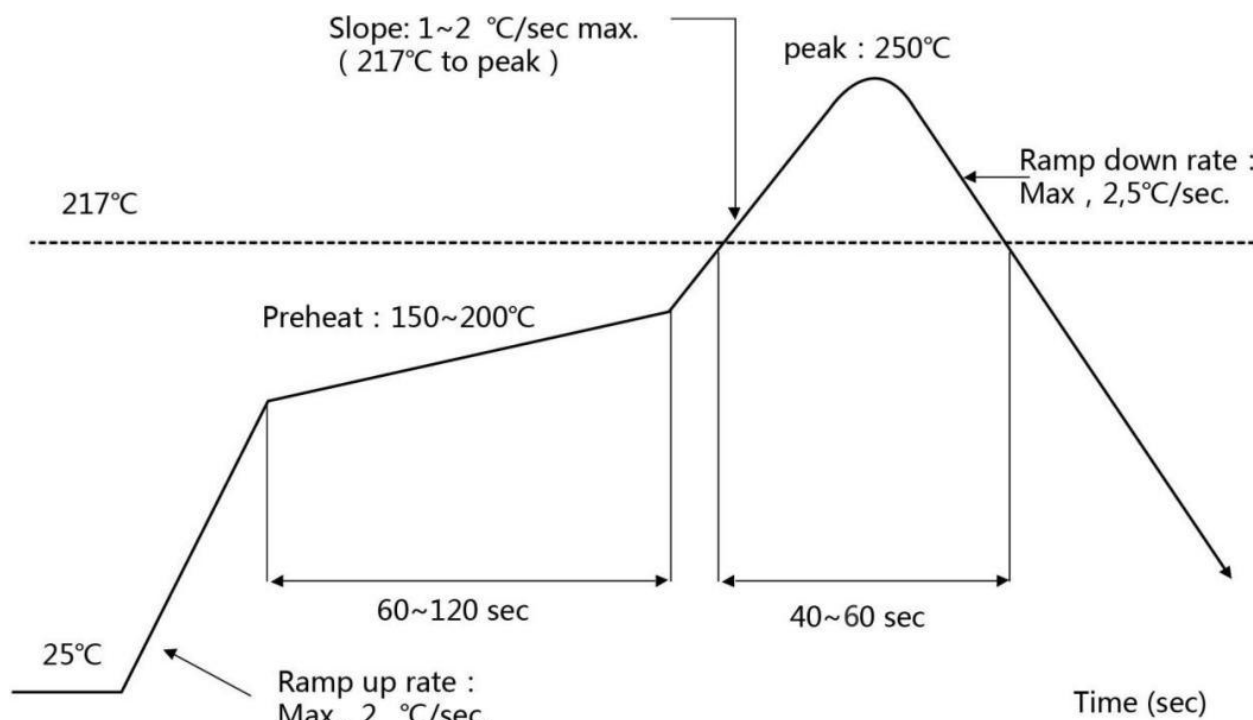
7 Environmental Requirements.

7.1 Recommended Reflow Profile.

Referred to IPC/JEDEC standard.

Peak Temperature : <245°C

Number of Times : ≤2 times



7.2 Note.

Note: Take and use the module, please ensure the electrostatic protective measures.

1. Reflow soldering temperature should be according to the customer the main size of the products, such as the temperature set at $250 + 5^{\circ}\text{C}$ for the MID motherboard.

About the module packaging, storage and use of matters needing attention are as follows:

2. The module of the reel and storage life of vacuum packing: 1). Shelf life: 8 months, storage environment conditions: temperature in: $< 40^{\circ}\text{C}$, relative humidity: $< 90\%$ r.h.

3. The module vacuum packing once opened, time limit of the assembly:

Card: 1) check the humidity display value should be less than 30% (in blue), such as: 30% ~ 40% (pink), or greater than 40% (red) the module have been moisture absorption. 2.) factory environmental temperature humidity control: $\leq -30^{\circ}\text{C}$, $\leq 60\%$ r.h..

3). Once opened, the workshop the preservation of life for 168 hours.

4. Once opened, such as when not used up within 168 hours:

1). The module must be again to remove the module moisture absorption.

2). The baking temperature: 125°C , 8 hours.

3). After baking, put the right amount of desiccant to seal packages.

7.3 Humidity sensitive control.

	CAUTION This bag contains MOISTUR-SENSITIVE DEICES	LEVEL 3 If blank, see adjacent bar code label
1. Calculatied shelf life an sealed bag: 12 months at < 40℃ and <90% relative humidity(RH)		
2. Peak package body temperature : _____ 260 _____℃		
3. After bag is opened ,devices that will be subjected to reflow solder of other high temperature process must a) Mounted within: _____ 168 _____ hrs. of factory confitions ≤30℃/60%RH, OR b) Stored at<10% RH		
4. Devices require bake,before mounting, if: a) Humidity Indicator Care is > 10% when read at 23 ± 5℃ b) 3a or 3b not met.		
5. If baking is required , devices may be baked for 48 hrs. at 125 ± 5℃		
Note : If device containers cannot be subjected to high temperature of shorted bake times are desired, reference IPC/JDEC J-STD-033 for bake procedure		
bag Seal Date : _____		
Note : level and body temperature defined by IPC/JEDEC J-STD-020		

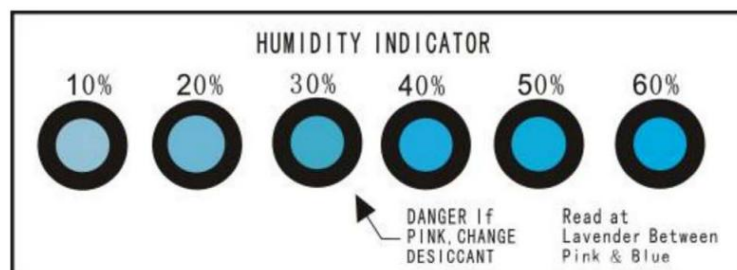
8 Package style.

8.1 Packaging Detail.

The module and the humidity indicator card are placed together in vacuum anti-static packaging, separated by a certain amount of paper, and neatly placed in the packaging box. The packaging must have reliable moisture-proof and anti-collision measures.

Note1:

There is a "triangular arrow" on the humidity indicator card indicating at 30%RH (as shown in the picture below). If the chemical changes to pink in the circle it points to, the element is damp and needs baking.



Note2:

Please confirm the packaging style with our sales staff before purchasing this product. If no packing style is specified before purchase, we will ship the goods by our own choice of packing method.

9 Transport regulations.

In the process of logistics or express transportation, attention should be paid to handling with care to avoid direct rain and snow.

10 Disclaimer and copyright notice.

All information in this document is provided according to the product status quo and subject to change without notice.

The contents of this document disclaim any warranties, including any warranties of fitness for sale, fitness for a particular purpose or non-infringement, and any warranties mentioned elsewhere in any proposal, specification or sample.

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11 Attention.

Due to product version upgrade or other reasons, the content of this manual may be changed. Shenzhen Uascent Technology Co., Ltd. reserves the right to modify the content of this manual without any notice or prompt. If users need to obtain the latest product information, please apply for the final document with our company. This manual is only used as a guide. Shenzhen Uascent Technology Co., Ltd. tries its best to provide the latest information in this manual, but does not guarantee that the content of the manual is completely accurate.

None of the statements, information and recommendations contained in this manual constitute any warranty, express or implied.

12 FCC statements:

The Module is designed to comply with the FCC statement. FCC ID is 2A68E-UAM053. The host system using Module, should have label indicated it contain modular's FCC ID: 2A68E-UAM053. This radio module must not installed to collocate and operating simultaneously with other radios in host system additional testing and equipment authorization may be required to operating simultaneously with other radio. The Module and its antenna must not be co-located or operating in conjunction with any other transmitter or antenna within a host device.

The modular must be installed in the host that assign by Company name: Shenzhen Uascent Technology Co.,Ltd, Model no.: UAM053 if other host types used would need further evaluation and possible C2PC if they are not significantly similar to the one tested The WIFI Module is designed for a compact PCB design. It should be installed and operated with host or other minimum distance of 20 centimeters between the radiator and your body." To comply with FCC regulations limiting both maximum RF output power and human exposure to RF radiation, the maximum antenna gain including cable loss in a mobile-only exposure condition must not exceed -1.2 dBi in 2.4G. The module uses PCB antenna, the antenna is sold with the module.

Notice to OEM integrator

The end user manual shall include all required regulatory information/warning as show in this manual. The OEM integrator is responsible for testing their end-product for any additional compliance requirements required with this module installed. If the final product contains circuits of other FCC PART 15 Subparts, the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed. The intended use is generally not for the general public. It is generally for industry/commercial use. The connector is within the transmitter enclosure and can only be accessed by disassembly of the transmitter that is not normally required, the user has no access to the connector. Installation must be controlled. Installation requires special training.

This device complies with Part 15 of the FCC Rules.

This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.

2.2

This module has been assessed against the following FCC rule parts: CFR 47 FCC Part 15 C (15.247. DTS). It is applicable to the modular transmitter

2.3

This radio transmitter Module has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

The concrete contents to check are the following three points.

- 1) Maximum antenna gains are shown in item 2.7 below.
- 2) Should be installed so that the end user cannot modify the antenna
- 3) Feed line should be designed in 50ohm

Fine-tuning of return loss etc. can be performed using a matching network.

The antenna shall not be accessible for modification or change by the end user.

2.4

The module complies with FCC Part 15.247 and apply for Single module approval.

2.5

Trace antenna designs: applicable.

Any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application.

The device must be professionally installed.

The intended use is generally not for the general public.

It is generally for industry/commercial use.

The connector is within the transmitter enclosure and can only be accessed by disassembly of the transmitter that is not normally required.

The user has no access to the connector.

Installation must be controlled.

Installation requires special training.

2.6

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

2.7

The following antennas have been certified for use with this module.

Only antennas of the same type with equal or lower gain may also be used with this module.

Other types of antennas and/or higher gain antennas may require the additional authorization for operation.

The installer should use unique antenna connector and Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device. The manufacturer of module will inform installer to meet with the FCC part 15.203 in the warning part.

Antenna Specification list below:

BLE/2.4G WIFI:

Antenna type: PCB Antenna

The max antenna gain (in dBi): -1.2 dBi

2.8

Please notice that if the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as "Contains FCC ID: 2A68E-UAM053 "; any similar wording that expresses the same meaning may be used.

2.9

Testing of the host product with all the transmitters installed - referred to as the composite investigation test- is recommended, to verify that the host product meets all the applicable FCC rules. The radio spectrum is to be investigated with all the transmitters in the final host product functioning to determine that no emissions exceed the highest limit permitted for any one individual transmitter as required by Section 2.947(f). The host manufacturer is responsible to ensure that when their product operates as intended it does not have any emissions present that are out of compliance that were not present when the transmitters were tested individually.

If the modular transmitter has been fully tested by the module grantee on the required number of channels, modulation types, and modes, it should not be necessary for the host installer to re-test all the available transmitter modes or settings. It is recommended that the host product manufacturer, installing the modular transmitter, perform some investigative measurements to confirm that the resulting composite system does not exceed the spurious emissions limits or band edge limits (e.g., where a different antenna may be causing additional emissions).

The testing should check for emissions that may occur due to the intermixing of emissions with the other transmitters, digital circuitry, or due to physical properties of the host product (enclosure). This investigation is especially important when integrating multiple modular transmitters where the certification is based on testing each of them in a stand-alone configuration.

2.10

Any company of the host device which install this modular should perform the test of radiated & conducted emission and spurious emission etc. according to FCC Part 15C: 15.247 and 15.209 & 15.207, part 15B: class B requirement, only if the test result comply with FCC part 15C: 15.247, 15B class B requirement. Then the host can be sold legally.

The host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification, If the grantee markets their product as being Part 15 Subpart B compliant (when it also contains unintentional-radiator digital circuitry), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

FCC Statement

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference.

(2) This device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The device has been evaluated to meet general RF exposure requirement. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body.